

# Talking Trash

6970

## INTRODUCTION

The data below show population and amount of garbage produced in the United States in different years. Look for patterns in the data.

Year	Garbage (millions of tons per year)	US Population (millions)
1960	88.1	179.979
1970	121.1	203.984
1980	151.6	227.255
1990	205.2	249.907
2000	234.0	281.422

## Activity Overview

### In this activity we will

- learn how to graph dependent and independent variables
- use the SciTools application to display data on your calculator

**Approximate Total Time: 15 minutes**

## Science Objective

Trends in US garbage production are illustrated as a graph. Students make predictions based on these data and develop solutions to the growing US trash problem.

## PROCEDURE

**1**

Turn on the calculator by pressing **[ON]**. Open the List Editor by pressing **[STAT]**, **[ENTER]**.

**2**

If the List Editor table has data in it, clear them from each column by moving the cursor to the top of the column and pressing **[CLEAR]**, **[ENTER]**.

**3**

Enter into list L1 the years from the data table above, starting with 1960 and ending with 2000. Your cursor should be highlighting the first row in L1. Press 1, 9, 6, 0, **[ENTER]**. Repeat the process to add each year to the list.

L1	L2	L3	1
1960	-----	-----	
1970			
1980			
1990			
2000			

L1(6)=

**4**

Press **[▶]** to highlight the first row in L2. Enter the data from the garbage column into L2.

# Talking Trash

5

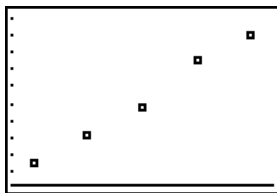
Press  $\blacktriangleright$  to move to L3. Enter the data from the population column.

L1	L2	L3	3
1960	88.1	179.98	
1970	121.1	203.98	
1980	151.6	227.26	
1990	205.2	249.91	
2000	234	281.42	
-----	-----	-----	
L3(6) =			

6

Make a graph of garbage production vs. year:

- Press  $\boxed{\text{APPS}}$ . Use the arrow keys to scroll down until SCI TOOLS is highlighted. Press  $\boxed{\text{ENTER}}$ . Press  $\boxed{\text{ENTER}}$  again to get to the main menu.
- Select 3:DATA/GRAPHS WIZARD. Press  $\boxed{\text{WINDOW}}$  to select PLOT DATA.
- Press  $\boxed{\text{Y=}}$  to select a scatter plot.
- Choose your independent variable. L1 should be highlighted. If not, use the arrow keys to scroll until L1 is highlighted. Press  $\boxed{\text{ENTER}}$ .
- Choose your dependent variable. Use the arrow keys to highlight L2. Press  $\boxed{\text{ENTER}}$ .



- On a separate sheet of paper, sketch the graph that results. Be sure to label the axes of the graph. The independent variable should be on the x-axis; the dependent variable should be on the y-axis. Give your graph a title.

7

To get back to the Data/Graphs Wizard, press  $\boxed{2\text{nd}}$ ,  $\boxed{\text{MODE}}$ ,  $\boxed{2\text{nd}}$ ,  $\boxed{\text{MODE}}$ .

8

Use the method in step 6 to graph garbage production vs. population by using L3 instead of L1. Before you do this, decide which will be the independent and which will be the dependent variable. Sketch the graph, label the axes, and give your graph a title.

9

Press  $\text{r}$ . Use  $\sim$  to move the cursor along the plotted points. You'll see that ordered pairs are given for each point. Record the ordered pair for the last point plotted on your graph.

## DATA ANALYSIS

- Describe the graph of garbage production vs. year. What was the general trend? Were there any years during which garbage production slowed down or sped up?
- In the graph of garbage production vs. population, what was the dependent variable? What was the independent variable? As in question 1, describe your graph.
- What was the ordered pair for the last point plotted on the graph of garbage production vs. population? What do these numbers represent?
- Describe any inconsistencies you noticed in the shapes of your graphs. What might explain them?
- What was the amount of garbage generated per person during 2000?
- How can you tell whether the data for 2000 represent a trend or a fluke? From your graph, predict what garbage production will be in the years 2010 and 2020. Will this prediction be difficult? Explain.

## EXTENSION

- Between which years did garbage production slow down? What economic or social factors may help explain this?
- Suggest ways that a downward trend in garbage production could be achieved.